CLASSROOM METHODS AND DEVICES

Problems in Geography—the Map

In a recent examination for a teacher's certificate given in a New England city, fifteen questions were asked; eleven and one-half of these, or nearly 75 per cent, were based on memory and belonged to the class of questions which have to do with location alone, two and one-half were economic in their intent and could be interpreted as geography questions only by the character of the answers, and one of the fifteen questions recognized geography as a relationship between the physical features and the organic inhabitants. If this may be taken as an index to the division of time devoted to geography in the grades and applied to a five-year course in geography from the fourth to the eighth grade inclusive, it would mean that nearly four years of the time should be devoted to the study of locations, about two-thirds of the remaining year to accessories or relevant items, and only one term to actual geographic presentation. Such a division of time cannot by any measure of efficiency be considered justifiable.

In the *Journal of Geography* for June, 1914, there is published a list of places recommended as suitable for thorough mastery by pupils in the schools of Springfield, Illinois, during their geography work of the fourth and fifth grades. In the list there are 371 places. The learning of these locations is not the geography work but a very necessary preparation for the work. It would be folly to use three-fourths of the time of the two years in learning and drilling on the list. The small number of names in the recommendation implies that there is something more to the subject, that there is a dynamic side as well as a static. This has been recognized in all our definitions of geography, whether relationship or response is the key-word, but teachers have not always acted accordingly. One difficulty which constantly arises lies in the inability to test with any degree of accuracy the stages of mental advancement. The examiner of teachers in the case stated at the beginning of this paper found it easier to test the memory than the reasoning power

of the candidates. And in any examination in geography questions on locations call for a definite and unequivocal answer. On the other hand, it is possible to examine reasoning processes in geography as concisely as in geometry, providing proper emphasis is placed upon the work during the school year. There is the danger here lest the teachers believe that the thorough mastery of the list is the only requirement, while for true geography work it is the basal requirement only. The lists represent the requirements of static geography. The time is not ripe for making out requirements of dynamic geography, but teachers should at least face in that direction. To use the knowledge that is gained is an aim in education, much more, perhaps, than is the acquisition of knowledge. Thus, if some means can be devised of applying knowledge in geography it will naturally follow that the testing in this new field will not lag far behind. Problems on the three main requirements of the map, the scale, the direction, and the legend, are recorded here. No claim of perfection is entered for them but they represent a type of work which aims at the ability to use knowledge. With each a number of questions are introduced which show a different type from the purely memory question. The work on scale and direction is much narrower in its scope than that on legend. In the latter instance a large variety of problems involving relationships and responses is possible.

SCALE

Scale is taught at the beginning of map work and afterward it is relegated apparently to the background as far as any future map work is concerned. The pupil sees in turn maps of South America on many scales, but little confusion arises from this because he easily adopts a ratio scale; confusion arises, however, when he jumps from a map of South America to a map of some other continent, as Africa. The inference is that the scale is the same. Thus, as in one of our leading textbooks, North America at 760 miles to an inch, South America at 640, Europe at 470, Africa at 840, Asia at 890, and Australia at 1,000 are an unfortunate variety unless the pupils make use of the scale. There are a number of problems here of more or less value which can be used to emphasize the scale, and they are largely scale determinations.

1. *By comparison of lengths.*—An outline map which the pupils are to use appears on the blackboard or on paper without a scale attached. The problem is to find the scale. By finding the same map in the textbook, the length and the scale of the textbook map are noted. The length of the given map is measured. It is known that the larger the map, the smaller the scale, or, in other words, the proportion is an inverse one, and our equation reads: the length of the map in the textbook divided by the length of the given map equals the unknown scale of the given map (the x) divided by the scale of the textbook map.

2. *By latitudes.*—This is a variation of the above. From the map in the textbook the pupils find the latitude of the northern and southern tips of the continent along a meridian and this yields the length of the map in degrees. In round numbers, using seventy miles as the length of one degree of latitude, the length of the map in miles can be found. Now by measuring the length of the given map and dividing its length in miles by its length in inches a good estimate of its scale is made.

3. *By comparative areas.*—The result of this yields, not a definite scale, but a ratio, and it is most effective when two maps of different scales are in use at the same time. For instance, a map of South America and a map of Australia are before the pupils. Two of the latitude lines for each map may be inserted near the edge—for South America, the equator, and the southern tropic. By subdividing the distance between these points into twenty-four parts a near approximation to one degree is gained. The pupils will be able to sketch roughly their own state. Pennsylvania is about two degrees in latitude and five in longitude. Upon the subdivisions just made draw a sketch of that state. Do the same thing for Australia. The resulting comparison which appears before the eye will indicate the diversity in the two scales. We can recognize the fact that degrees of longitude vary in the number of miles in different latitudes by the use of latitude distances alone, as Pennsylvania is two degrees in latitude and twice as wide, linear measurement, in longitude.

Upon these as a background a great variety of problems can be based which will make the study, not a theoretical, but a practical

one. For the upper grades, at least, it will call into use the knowledge which was gained in the earlier grade and will also emphasize the more important ideas concerning scale. And such questions as the following will show in their solution a process of reasoning rather than of memory.

1. Given a map of New England with political boundaries. If the northern boundary of Massachusetts is 42° 45′ N. Latitude and the northern boundary of Vermont is 45° N. Latitude, what is the scale of the map?

2. In the above map, knowing the scale, find the latitude of the northern boundary of Connecticut.

3. Draw an island 120 miles, north to south, by 40 miles, east to west, located at 43 S. Latitude and 75 W. Longitude, distances to be indicated by parallels and meridians.

DIRECTION

The most common mistakes in direction arise from the overlooking of the direction lines, parallels, and meridians on the map. This is the result of the bad habit of considering "up" as north, the "right" as east, and so on. The practical drill on direction must have for an objective the forming of a new habit strong enough to overcome the old; or better still the right habit in the first place. This means a recognition but not necessarily a training in the various nets for projection. For example, take the Mercator projection with horizontal parallels and vertical meridians, Flamsteed's with horizontal parallels and curved meridians, and the conic with curved parallels and straight but diverging meridians. The manner of making these nets need not be known, but it is well that the earmarks of each be learned so that the pupils may decide in most cases what the projection is. The drill in this case is to place two dots on the network and allow the pupils to state the direction one is from the other. Thus of two horizontal dots on the Mercator one will be east of the other, the same on Flamsteed's, but on the conic the direction will depend largely on the part of the map used, whether one point is northeast, east, or southeast of the other. The drill should be complete enough to show all the possibilities of the projections and the problem element based on the drill may reverse the operation.

1. Using two points marked *A* and *B*, draw a network which will make *B* east of *A*.

2. Using the same positions, make *A* southwest of B; northwest.

3. Using three points marked *A*, *B*, and *C*, draw a network making *B* south of *A* but west of *C*.

4. Using the same points, make *B* and *C* south of *A*.

LEGEND

While the interpretation of scale and direction is a part of map-reading and may properly be included under this heading, the term "legend" is usually confined to the conventional signs by which physical and political features are indicated. Many maps, especially the political, show little more than distribution. A few items like nearness to the sea and distance north and south of the equator are common to all maps. Political maps are the sources of most of the questions of static geography. Distribution is the result of physical conditions, and to the items already referred to as common to all maps there should be added as time goes on the general topography and the wind belts, the latter with the latitude yielding the climatic status. If, then, geography is really taught as a relationship or response, the general type of question which begins with "Where is" will give way to the type beginning "Why is." A great variety of drill exercises may be devised.

A. There is the class which is based on the resultant of the wind belts and the topography, including the migration of the planetary belts.

1. Draw the map of an area under the westerlies having a rainy and a dry region.

2. Draw a map of an area under the doldrums and the trades having a wet and a dry season.

3. Draw a map of an area with two rainy and two dry seasons per year.

4. Draw a map with an area with little rain throughout the year.

In drawing the maps, topography should be indicated by colors, the pupils using as nearly as possible the proper shades for mountains, highlands, uplands, and lowlands, and indicating the wind belts in the conventional way.

B. There is the class which has to do with the conditions of growth of vegetation and which differs from the above only in an added factor.

1. Rice demands warm temperatures during a long growing season and plenty of moisture. Draw a map of an area containing a rice area and a desert.

2. Grazing is carried on on mountain slopes not densely wooded and on semi-arid plains. Draw a map of a country having a rice area and a grazing-area.

C. To these may be added in turn a number of physical features.

1. Draw a map of a region including an area of interior drainage, a rice field, a coastal plain, and a heavily forested tract.

2. Draw a map of an area containing a manufacturing city dependent on the immediate neighborhood for its raw materials and shipping its wares to distant lands.

3. Draw a map of an area containing a large river and a seaport shipping hides.

4. Draw a map of a country growing coffee (on uplands in tropics under plenty of rain) and rice, with a large port and a city which may be used as a health resort.

As the experience of the pupils widens, most of the answers will represent actual places on the earth, although at the beginning the maps may be purely hypothetical.

In the preparation for this work, the teacher will find that her time limit will be a great restraint so that it will devolve upon her to select from a large array of examples. Each physiographic province of the earth may be treated in detail and many problems may be devised to test the pupils' grasp of the subject, but probably a typical case will be all that the teacher can afford to use because of other work, as, for example, the desert with its many variations: the desert under the trades; the desert on the leeward side of mountains; irrigation, the Nile case; irrigation, the Uncompaghre case; oases; and many others.

The result of such exercises as have been indicated will meet more nearly the requirements which geography workers should insist upon, and certainly the work of the schools both in place geography and in this study of relationships will receive thereby a better balance.

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